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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/748,699

Applicant(s)

NAM ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18,20-27 and 29-36 is/are pending in the application.
- 4a) Of the above claim(s) 11-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10,17,18,20-27,29-32 and 34-36 is/are rejected.
- 7) ☒ Claim(s) 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 September 2007 has been entered.

Allowability Withdrawn

2. The indicated allowability of claims 8-10, 17, 18, 20-27, and 29-36 is withdrawn in view of the newly discovered reference(s) to *Jun, Kim '376*, and *Kim '379*. Rejections based on the newly cited reference(s) follow.

Response to Arguments

3. Applicant's arguments filed 19 September 2007 have been fully considered but they are not persuasive.

The applicant argues [pp.8-9] that neither *Dohjo* nor *Lee* teaches the amended limitation in claim 1 that "wherein in the edge portion of the gate line that is bent angularly and inwardly, some parts are overlapped with the data line, and the rest are not overlapped with the data line". However, as noted in the advisory action of 1 August

2007, it appears that this feature is disclosed by the primary reference *Kim*. The previous rejections of claims 1-7 based on *Kim* are therefore maintained, modified as necessary by the amendment.

Claim Objections

4. Claim 10 is objected to because of the following informalities: "bent portion" should be "bent edge portion". Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 17, 18, and 20-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites "a notch is formed in a boundary of a second side of the gate line ... such that *a length of the boundary where a portion of the notch overlaps the data line is greater than a width of the data line*". This is unclear. Is "the boundary" the same as the previously recited "a boundary"? Does this just mean "a part" and "the part", in other words? It appears that this length is not clearly defined. The applicant's invention appears to be that "a length of the edge of the gate electrode which overlaps the data line is greater than a width of the data line" (suggested phrase, analogous to claim 18); which is satisfied, for instance, if the edge of the gate line does not cross the data line

Art Unit: 2871

as a straight line at right angles. The applicant's invention does not appear to be that the length of the part of the notch which overlaps the data line (note that the notch never completely covers the data line in the applicant's figures) is greater than a width of the data line. For examining purposes, it is assumed that the suggested phrase is used in place of the italicized phrase.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3, 5, 6, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by *Jun*, U.S. Patent No. 7,199,850.

Jun discloses [see Figs. 1a and 1d, for instance] a substrate [10], a gate line [20] arranged in one direction on the substrate and having an edge portion bent angularly and inwardly [the notch at the upper side of the gate line overlapping the data line], a gate electrode [21] projecting from the gate line, a gate insulating layer [40] disposed on the substrate, a data line [70] overlapping some of the bent edge portion of the gate line, the data line perpendicular to the gate line to define a pixel region, a source electrode [71] projecting from the data line, a drain electrode [72] on the gate insulating

layer at a fixed interval from the source electrode, an active layer [50] below the data line, source electrode, and drain electrode, a pixel electrode [90] in the pixel region, and wherein in the edge portion of the gate line that is bent angularly and inwardly, some parts are overlapped with the data line, and the rest are not overlapped with the data line [see Fig. 1a]. Claim 1 is therefore anticipated.

The active layer overlaps an upper side of the gate electrode and predetermined portions of the source and drain electrodes, so claim 3 is also anticipated. The pixel electrode is made of ITO [col. 9, lines 44-45], so claim 5 is also anticipated. There is a passivation layer [80] on an entire surface of the substrate, the passivation layer having a first contact hole [81] at one portion of the drain electrode, so claim 6 is also anticipated.

Considering the further limitations of claim 8, *Jun* also discloses that the gate electrode has a predetermined edge portion bent angularly and inwardly [see Fig. 1a], with the drain electrode overlapped with the bent edge portion of the gate electrode. Claim 8 is therefore anticipated as well.

9. Claims 1, 3, 4, and 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by *Kim et al.*, U.S. Patent No. 6,882,376.

[The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

Art Unit: 2871

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.]

Kim '376 discloses [see Figs. 4 and 5, for instance] a substrate [110], a gate line [121] arranged in one direction on the substrate and having an edge portion bent angularly and inwardly [the notch at the lower side of the gate line overlapping the data line], a gate electrode [122] projecting from the gate line, a gate insulating layer [130] disposed on the substrate, a data line [161] overlapping some of the bent edge portion of the gate line, the data line perpendicular to the gate line to define a pixel region, a source electrode [162] projecting from the data line, a drain electrode [163] on the gate insulating layer at a fixed interval from the source electrode, an active layer [141] below the data line, source electrode, and drain electrode, a pixel electrode [181] in the pixel region, and wherein in the edge portion of the gate line that is bent angularly and inwardly, some parts are overlapped with the data line, and the rest are not overlapped with the data line [see Fig. 4]. Claim 1 is therefore anticipated.

The active layer overlaps an upper side of the gate electrode and predetermined portions of the source and drain electrodes, so claim 3 is also anticipated. The data line comprises Mo [col. 5, line 12], so claim 4 is also anticipated. There is a passivation layer [170] on an entire surface of the substrate, the passivation layer having a first contact hole at one portion of the drain electrode [see Fig. 5], so claim 6 is also anticipated. The passivation layer comprises an inorganic or organic insulating material [col. 7, lines 38-41], so claim 7 is also anticipated.

Considering the further limitations of claim 8, *Kim '376* also discloses that the gate electrode has a predetermined edge portion bent angularly and inwardly, with the drain electrode overlapped with the bent edge portion of the gate electrode. Claim 8 is therefore anticipated as well.

10. Claims 1-3, 5, 8-10, 17, 18, 20-22, 24-27, 29-32, and 34-36 are rejected under 35 U.S.C. 102(e) as being anticipated by *Kim et al.*, U.S. Patent No. 7,233,379.

[The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.]

[The rejection could also possibly be overcome by the submission of a certified translation of the applicant's foreign priority document to perfect a foreign priority date before 2 December 2003.]

Kim '379 discloses [see Figs. 6, for instance] a substrate, a gate line [31a] arranged in one direction on the substrate and having an edge portion bent angularly and inwardly [28], a gate electrode [35] projecting from the gate line, a gate insulating layer disposed on the substrate, a data line [33a] overlapping some of the bent edge portion of the gate line, the data line perpendicular to the gate line to define a pixel region, a source electrode [36a] projecting from the data line, a drain electrode [36b] on the gate insulating layer at a fixed interval from the source electrode, an active layer [37]

Art Unit: 2871

below the data line, source electrode, and drain electrode, a pixel electrode [39a] in the pixel region, and wherein in the edge portion of the gate line that is bent angularly and inwardly, some parts are overlapped with the data line, and the rest are not overlapped with the data line [see Fig. 6]. Claim 1 is therefore anticipated.

At least a section of the bent edge portion of the gate line is curved [32], so claim 2 is also anticipated. The active layer overlaps an upper side of the gate electrode and predetermined portions of the source and drain electrodes, so claim 3 is also anticipated. The pixel electrode comprises ITO [col. 5, line 18], so claim 5 is also anticipated.

Considering the further limitations of claim 8, *Kim* '379 also discloses that the gate electrode has a predetermined edge portion bent angularly and inwardly [see Fig. 6], with the drain electrode overlapped with the bent edge portion of the gate electrode. Claim 8 is therefore anticipated as well.

At least a section of the bent edge portion of the gate line is curved [32], so claim 9 is also anticipated. At least a section of the bent edge portion of the gate electrode is curved, so claim 10 is also anticipated.

Considering the additional limitations of claim 17, *Kim* '379 also discloses a notch [28, taken to be the cut-out part from the tip of bump 32 near the middle of the data line to where 28 ends in the pixel underneath the gate electrode] formed in a boundary of the second side of the gate line opposing the first side, and disposed between an edge of the gate electrode [on the right] and an edge of the data line [on the left], such that a boundary where a portion of the notch overlaps the data line is greater than a width of

the data line [as discussed above under 35 USC 112]. Claim 17 is therefore anticipated.

A boundary of the gate electrode that overlaps the drain electrode is greater than a width of the drain electrode, so claim 18 is also anticipated. At least a section of the notch is disposed directly opposite to the gate electrode, so claim 20 is also anticipated. An edge of the notch [on the left] is aligned with an edge of the gate electrode [on the left], so claim 21 is also anticipated. The edge of the notch [taken slightly off-center, where the edge is curving] and the edge of the gate electrode are non-parallel with an edge of a portion of the gate line in which the notch is not formed, so claims 22 and 26 are also anticipated. The width of the notch is less than the width of the gate electrode, so claim 24 is also anticipated. A length of the notch is less than a length of the gate electrode, so claim 25 is also anticipated.

Considering the additional limitations of claim 27, *Kim '379* also discloses wherein changes in a capacitance formed by a total overlap between the gate line and the data line [C_{GL-DL}], and one of between the gate electrode and the data line [C_{GE-DL}] and between the gate electrode and the source electrode [C_{GE-SE}], are substantially compensated for with movement of the gate line in a direction of a width of the data line [when the gate line and gate electrode are shifted horizontally to the left, say, C_{GL-DL} decreases, while C_{GE-DL} increases, thus they are compensated for by the change in the other]; and a boundary of the gate electrode that overlaps the drain electrode is greater than a width of the drain electrode, so claim 27 is also anticipated.

Art Unit: 2871

A notch in the data line decreases the capacitance between the gate line and the data line and substantially compensates for the capacitance between one of the gate electrode and the data line and between the gate electrode and the source electrode, so claim 29 is also anticipated. Claims 30-32 and 34-36 are analogous to claims 20-22 and 24-26, so they are also anticipated.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 2, 4, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Jun*, U.S. Patent No. 7,199,850 in view of official notice.

Jun does not disclose that at least a section of the bent edge portion of the gate line is curved; instead, it is made of a series of line segments. The examiner takes official notice that such line segments approximate a curve. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a curve rather than the series of line segments, motivated by the equivalency of the two for this purpose; the examiner notes that such changes in shape have been judicially found to have been obvious absent persuasive evidence that the particular configuration is significant [see MPEP 2144.04]. Claim 2 is therefore unpatentable. The same argument applies to the limitations of claims 9 and 10; claims 9 and 10 are similarly unpatentable.

Jun does not disclose that data line comprises a metal of Cr, Mo, Ti, Ta, and Mo alloys MoW, MoTa, or MoNd. The examiner takes official notice that Mo, for instance, was well-known in the art for use as the data line. It would have been obvious to one of ordinary skill in the art at the time of the invention to use Mo, motivated by its desirable conductivity, ease of processing, etc. Claim 4 is therefore unpatentable.

Jun does not disclose that the passivation layer comprises one of inorganic and organic insulating material. The examiner takes official notice that these were well-known in the art for use making a passivation layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so, motivated by these being conventional. Claim 7 is therefore unpatentable.

13. Claims 2, 5, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim et al.*, U.S. Patent No. 6,882,376 in view of official notice.

[This rejection under 35 USC 103 could possibly be overcome by a statement that the application and reference were commonly assigned at the time of the invention.]

Kim does not disclose that at least a section of the bent edge portion of the gate line is curved; instead, it is made of a series of line segments. The examiner takes official notice that such line segments approximate a curve. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a curve rather than the series of line segments, motivated by the equivalency of the two for this purpose; the examiner notes that such changes in shape have been judicially found to have been obvious absent persuasive evidence that the particular configuration is significant [see

Art Unit: 2871

MPEP 2144.04]. Claim 2 is therefore unpatentable. The same argument applies to the limitations of claims 9 and 10; claims 9 and 10 are similarly unpatentable.

Kim does not disclose that the pixel electrode is ITO, IZO, or ITZO. The examiner takes official notice that ITO was well-known in the art for use as the transparent conductive electrode. It would have been obvious to one of ordinary skill in the art at the time of the invention to use ITO, motivated by its desirable conduction and transmittance properties. Claim 5 is therefore unpatentable.

14. Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim et al.*, Korean Patent Document No. P1999-0074559 (made of record by the applicant), in view of *Dohjo et al.*, U.S. Patent No. 6,078,366.

Kim discloses [see Figs. 2 and 3] an LCD comprising a substrate [1], gate line [2] having an edge portion bent angularly (at the edge where the sine-wave part meets the straight part) and inwardly (the parts of the sine-wave region adjacent the straight part, for instance), gate electrode [21] projecting from the gate line, gate insulating layer [3], data line [6] overlapping some of the bent edge portion of the gate line, source electrode [61] and drain electrode [62], and pixel electrode [8], wherein in the edge portion of the gate line that is bent angularly and inwardly, some parts [for instance, in Fig. 2 consider the lower edge of the gate line where it crosses the left edge of the data line] are overlapped with the data line, and the rest are not overlapped with the data line.

Kim does not explicitly disclose an active layer below the data line, source electrode, and drain electrode [4 is only below the source and drain electrodes]. *Dohjo* discloses [see title, Figs. 2 and 17, for instance] an active layer which is below the data

Art Unit: 2871

line as well as the source and drain electrodes. It would have been obvious to one of ordinary skill in the art at the time of the invention to have such an active layer in the device of *Kim*, motivated by *Dohjo*'s teaching that this provides higher production yield due to suppressing capacitance fluctuations and shorting, and reduces the number of masking steps needed [col. 18, lines 42ff., for instance]. Claim 1 is therefore unpatentable.

At least a section of the bent edge portion is curved, so claim 2 is also unpatentable. The active layer overlaps the upper side of the gate electrode and portions of the source and drain electrodes, so claim 3 is also unpatentable. There is a passivation layer [7] with a contact hole, so claim 6 is also unpatentable.

15. Claims 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kim et al.*, Korean Patent Document No. P1999-0074559 (made of record by the applicant), in view of *Dohjo et al.*, U.S. Patent No. 6,078,366 as applied above, and further in view of *Lee*, US 2002/0163602.

Kim does not appear to explicitly disclose that the data line comprises one of the metals recited in claim 4. *Lee* discloses an analogous LCD in which the data line is made of Cr or Mo [paragraph 0081]. *Kim* does not appear to explicitly disclose that the pixel electrode comprises one of the materials recited in claim 5. *Lee* discloses an analogous LCD in which the pixel electrode is made of ITO. *Kim* does not appear to explicitly disclose the passivation layer being an inorganic or organic insulating material as recited in claim 7. *Lee* discloses an analogous passivation layer [48] which is an organic or inorganic material [paragraph 0085]. In each case, the use of such materials

Art Unit: 2871

would have been obvious to one of ordinary skill in the art at the time of the invention, motivated by these being the conventional materials used for such elements in LCDs, which brings advantages of availability, obviating the need for experimentation and development, ability to use pre-existing manufacturing equipment and supplies, etc.

Claims 4, 5, and 7 are therefore unpatentable.

Allowable Subject Matter

16. Claim 33 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claim 23 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the device of claim 23, in particular the additional limitation that the edge of the notch and the edge of the gate electrode are parallel with the edge of the data line. Claim 23 would therefore be allowable if rewritten appropriately, and if the rejection of claim 17 under 35 USC 112, 2nd paragraph is overcome appropriately.

The prior art does not disclose the device of claim 33, in particular the additional limitation that the edge of the notch and the edge of the gate electrode are parallel with

Art Unit: 2871

the edge of the data line. Claim 33 would therefore be allowable if rewritten appropriately.

If the rejections in view of *Kim* '379 are appropriately overcome as indicated above, and the rejection under 35 USC 112, 2nd paragraph were overcome, then claims 17, 18, 20-27, and 29-36 would be allowable, for the following reasons:

The prior art would not disclose the device of claim 17, in particular the limitation that there is a notch formed in a boundary of a second side of the gate line, disposed between an edge of the gate electrode and an edge of the data line, such that the length of the boundary where a portion of the notch overlaps the data line is greater than a width of the data line, wherein the data line is adjacent to the gate electrode. [In particular, *Kim* '376 fails to meet two limitations of claim 17: first, the notch in the second side of the gate line, while it is to the left of an edge of the gate electrode, overlaps both edges of the data line, so it is not "between an edge of the gate electrode and an edge of the data line"; second, the length of the boundary where a portion of the notch overlaps the data line is the same as the width of the data line, not greater than it.] Claim 17 would therefore allowed, as would its dependent claims 18 and 20-26.

The prior art would not disclose the device of claim 27, in particular the additional limitation (amended from the previous claim 28) that a boundary of the gate electrode that overlaps the drain electrode is greater than a width of the drain electrode. [In particular, *Kim* '376 has a boundary of the gate electrode that overlaps the drain electrode being the same as, not greater than, the width of the drain electrode.] Claim 27 would therefore allowed, as would its dependent claims 29-36.

Election/Restrictions

19. Claims 11-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 23 June 2005.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/748,699
Art Unit: 2871

Page 17

A handwritten signature in black ink, appearing to read "Andrew Schechter".

Andrew Schechter
Primary Examiner
Technology Center 2800
28 September 2007